

Work Order ID 123976

September-04-14 11:56:22 AM

123976

Page 1

Item ID: D6011-115 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Material
 Start Date: 9/04/14 Start Qty: 20.00 ***20*** Cust Item ID:
 Required Date: 8/31/15 Req'd Qty: 20.00 ***20*** Customer:
 Reference:

Approvals: Process Plan: MCS Date: 14-09-04 Tooling: _____ Date: _____
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____
 Run Start ***NR1***
 Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D6011	Rev A1								

100

0.00

100

Purchasing

Purchasing

PURCHASING

Memo

0.00

Issue P/O: 25798

a) Order as per Dwg D6011

b) Material: 2.750 x 0.650 wall 7075-T6/T6511 (WW-T-700/7 or QQ-A-225/9 or QQ-A-200/11) seamless aluminum tube

c) Minimum ultimate tensile strength = 77 ksi

d) Minimum tensile yield strength = 66 ksi

e) Material cert's is required

EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.

MUST BE WELL PACKAGE, IF NOT IT WILL BE REFUSE

CL 14/09/16 20

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Page 2

Item ID: D6011-115 Accept *N900040100* Setup Start *NS1*
 Revision ID: Stop *NS2*
 Item Name: Crosstube Material
 Start Date: 9/04/14 Start Qty: 20.00 *20* Cust Item ID:
 Required Date: 8/31/15 Req'd Qty: 20.00 *20* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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110	Receive & Inspect for Damage & Mat'l Certs	0.00							
-----	--	------	--	--	--	--	--	--	--

110

Packaging	Memo	0.00							
-----------	------	------	--	--	--	--	--	--	--

Packaging	Ensure material certification is attached								
-----------	---	--	--	--	--	--	--	--	--

120	QC6- Inspect dimensions to drawing	0.00							
-----	------------------------------------	------	--	--	--	--	--	--	--

120

QC	Memo	0.00							
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Quality Control	Ensure Material certification comply to Dwg								
-----------------	---	--	--	--	--	--	--	--	--

140	Identify as per dwg & Stock Location: <u>LG003</u>	0.00							
-----	--	------	--	--	--	--	--	--	--

140

Packaging	Memo	0.00							
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Packaging

19x SPK-08-07

(20) 19

DAS
38
9-89
AUG 24 2015

(20) 19

DAS
49
9-89
15/09/09

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
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Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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September-04-14 11:56:22 AM

Page 3

NS1

Stop *NS2*

Customer:

Run Start *NR1*

Stop *NR2*

Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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0.00

0.00

Quality Control

120150910

GA

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

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Training									
Transport									
Unapproved									

FAULT CATEGORY

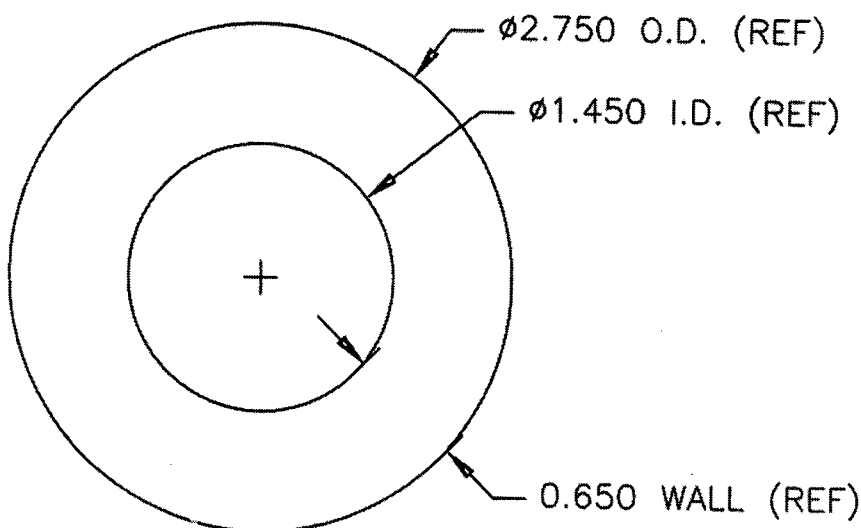
Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence
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		☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other



DESIGN #	DRAWN BY RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED #	APPROVED #	DRAWING NO. D6011	REV. A SHEET 1 OF 1
DATE 01.08.16		TITLE CROSSTUBE MATERIAL	SCALE 1:1
A	01.08.16	NEW ISSUE	
A1	02-01-29	UPDATE TOLERANCE ON OD.	

SPECIFICATION CONTROL DRAWING

RELEASED
01.08.17 #



NOTES

- 1) D6011-XXX CROSSTUBE
LENGTH

WHERE XXX IS LENGTH IN INCHES
EG. 115" LONG TUBE: D6011-115

- 2) MATERIAL: 2.750 OD x 0.650 WALL 7075-T6/T6511 (WW-T-700/7 OR QQ-A-225/9 OR QQ-A-200/11) SEAMLESS ALUMINUM TUBE.
MINIMUM ULTIMATE TENSILE STRENGTH = 77 ksi
MINIMUM YIELD TENSILE STRENGTH = 66 ksi

- 3) TOLERANCES ARE PER ~~ASTM B210~~ AS FOLLOWS: ~~ANSI H35.2~~ AS FOLLOWS
O.D.: ~~± 0.006 MEAN (± 0.012 INCLUDING OVALITY)~~ ± 0.015 MEAN (± 0.030 INCL. OVALITY)
WALL: ± 0.020 MEAN (± 0.065 INCLUDING ECCENTRICITY)
LENGTH: XXX +0.125/-0.000
STRAIGHTNESS: 0.010" DEVIATION / 12" LENGTH

- 4) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 5) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

14-09-04
MCS
123936
WORK ORDER
WITHOUT NOTICE
SUBJECT TO AMENDMENT
CONTROLLED COPY
RETURN TO
ENGINEERING
SHIP COPY



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Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID PO25798

Purchase Order Date 9/16/2014

PO Print Date 9/23/2014

Page Number 2 of 5

Order From :

VU-ALU001

Ship To : DART AEROSPACE LTD

ALUMINIUMWERK UNNA AG
630 3033 SOUTH PARKER RD
AURORA, CO 80014
USA

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Buyer

Chantal Lavoie

Vendor Phone

303 755 5672

Customer POID

Customer Tax #

10127-2607

Ship To Contact

Terms

Wire

Ship To Phone

Currency

USD

Ship Via:

Contract Shipping

FOB

DDP - (Delivered Duty Paid)

Ship Acct:

Line Total: \$25,080.00

4 D6010-115P

Crosstube Material

7/30/2015

Yes

7/30/2015

Each

\$347.00

\$15,268.00

EXTRUDE AS PER DWG D6010-115 REV. A
B123975

Line Total: \$15,268.00

5 D6011-115P

Crosstube Material

8/31/2015

Yes

8/31/2015

20.00

Each

\$720.00

\$14,400.00

EXTRUDE AS PER DWG D6011-115 REV. A
B123976

Line Total: \$14,400.00

6 D6003-102P

Crosstube Material

11/16/2015

Yes

11/16/2015

40.00

Each

\$394.00

\$15,760.00

EXTRUDE AS PER DWG D6003-102 REV. A
B123962

Note:

9/23/2014



Boxmarking:

We hereby declare that the wooden packing material are totally free from bark and apparently

free from live plant pests

8 15-08-07

Abnahmeprüfzeugnis 3.1 - DIN EN 10204:2005

Inspection Certificate 3.1 - DIN EN 10204:2005 / Certificat de Reception 3.1 - DIN EN 10204:2005

Kunde: Dart Aerospace Ltd.

Client: 1270 Aberdeen Street
K6A1K7 Hawkesbury, ON Canada

Zeugnisnummer: 979/15

Cert No. / No. du certificat:

Bestellnummer: PO25798

Order No. / No. de commande

Auftrag: 54642/500

Our Reference/Notre Reference:

Produkt: Rohre nahtlos gepresst

Product / Produit: Tubes seamless extruded

Spezifikation: AMS - QQ - A - 200/11; -

Specification:

Werkstoff: 7075

Alloy/Alliage:

Zustand: T 6511

Temper/État

Abmessung: 2,750 INCH x 1,450 INCH x 0,650 INCH x 115,000 INCH

Size / Dimension: D6011-115

Kennzeichnung: Cert No.979/15 - ALUnna - 7075 - T6511 - Cast No.3559 - AMS - QQ - A - 200/11 - 2.750" OD x 0.650" Wall - Heat Lot No.1304636 -
Marking/Marquage: ALUnna Order Conf.No.54642/500-1 - P.O. 25798

Lieferung

Delivered Material / Matériel délivré:

pcs.

19

lbs

948

Country of Manufacture: Germany

Products are in accordance with applicable RoHS

1. Chemische Analyse

Chemical Analysis / analyse chimique

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Pb	Zr	Bi	Sn	Ni	Na
Charge/ min.			1,2		2,1	0,18	5,1							
Cast No. max.	0,40	0,50	2,0	0,30	2,9	0,28	6,1	0,20						
3559/15	0,103	0,182	1,481	0,044	2,483	0,216	5,885	0,038	0,002	0,0208	0,0001	0,0015	0,0058	0,0008

Hydrogen content: 0,12

ccm/100 g Al Elements without indication < 0,01 %

country of melt manufacturer: Germany

2. Mechanische Eigenschaften

Mechanical Properties / Valeurs Mécaniques

Anforderungen Requirements	tensile (Rm) ksi	yield (Rp0,2) ksi	elongation 2" %	elongation A %	Hardness HB	Heat Lot No.
	81,0	72,0	7,0			
1	86,130	78,445	8,0			1304636
2	87,290	79,605	8,0			

RMS: outside 25 - max. 11,3 µ"

Ergebnis der Prüfungen:

Es wird bestätigt, daß die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht

Test results:

We confirm that the delivery has been tested and applies to the agreements made on receipt of the order

Resultats:

Nous confirmons que la livraison a été contrôlée et correspond avec les conventions faites à la réception de la commande

mergardtri



Certified acc. DIN EN ISO 9001:2008 and DIN EN 9100:2009

valid until 2016-11-10

Cert - Reg. No.: 001959 QM08; 001959 ASH 09-1



ALUnna

Abnahmebeauftragter

09.07.2015

Aluminiumwerk Unna AG, Uelzener Weg 36, 59425 Unna, Germany

EXTRUSION INSPECTION SHEET



		SIDE A		SIDE B		Measurment unit Inches		Symbol "		ULTRA SONIC MEASURMENTS					
TUBE #	TOTAL LENGTH	DIA		DIA		INSIDE DIA	wall thickness measured w/vern		Strightness at 12" in middle	Rockwell Reading	LOCATION on tube	R1	R2	R3	R4
		R1	R2	R1	R2										
DWG										N/A	Middle	N/A			
1	115"	2.752	2.751	2.752	2.748	1.451	.670	.650	.00563	N/A	Middle	.627	.659	.665	.635
2	115"	2.749	2.751	2.754	2.748	1.447	.640	.668	.00442	N/A	Middle	.644	.638	.666	.668
3	115"	2.768	2.751	2.749	2.759	1.452	.640	.665	.00386	N/A	Middle	.648	.663	.662	.647
4	115"	2.749	2.766	2.751	2.771	1.442	.642	.672	.00231	N/A	Middle	.643	.652	.666	.660
5	115"	2.747	2.747	2.743	2.760	1.434	.639	.651	.00582	N/A	Middle	.639	.637	.662	.663
6										N/A	Middle				
7										N/A	Middle				
8										N/A	Middle				
9										N/A	Middle				
10										N/A	Middle				
11										N/A	Middle				
12										N/A	Middle				
13										N/A	Middle				
14										N/A	Middle				
15										N/A	Middle				
16										N/A	Middle				
PART #		D6011-115				P/O#		25798		BATCH #		13123976		Notes:	

4

100

Journal of Management Education 30(6)

Figure 1 consists of five line graphs labeled A, B, C, D, and E, arranged in two rows. The top row contains graphs A, B, and C, and the bottom row contains graphs D and E. Each graph plots 'Percentage correct' on the y-axis (from 0 to 100 in increments of 20) against 'Trial' on the x-axis (from 1 to 10). Two data series are shown in each graph: 'No feedback' (represented by a line with open circles) and 'With feedback' (represented by a line with filled circles). In the 'No feedback' condition, subjects A, B, and C show a gradual increase in accuracy, reaching approximately 80%, 85%, and 80% respectively by trial 10. Subjects D and E remain near 50% accuracy throughout the trials. In the 'With feedback' condition, all subjects show a rapid increase in accuracy, reaching near 100% by trial 10.

1950

1992

[illegible]

20

The diagram illustrates a 2D lattice structure. A central point is labeled i . A point at distance r is labeled $i+r$. A point at distance r' is labeled $i+r'$. Arrows indicate nearest-neighbor interactions between adjacent points in the lattice.

